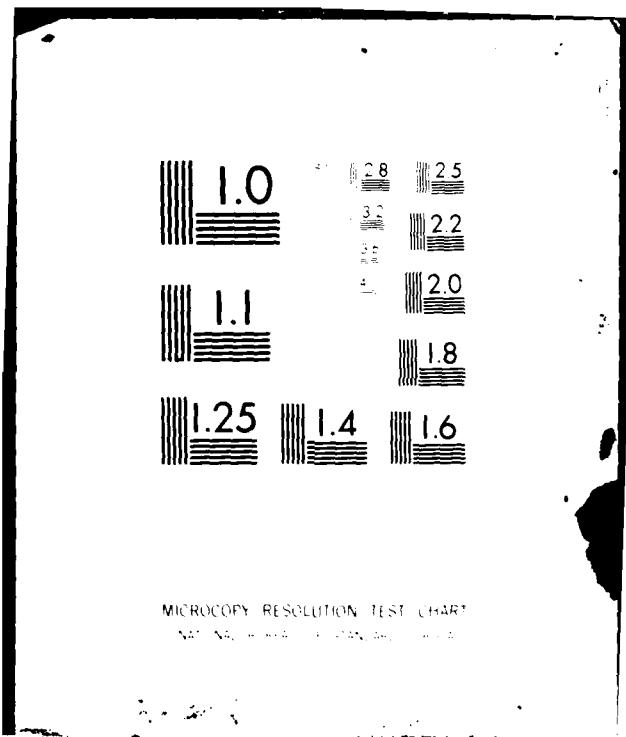


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RELATING ATTITUDES TOWARD NAVY LIFE TO REENLISTMENT DECISIONS

Jean W. Fletcher
Kurt L. Giesler

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RELATING ATTITUDES TOWARD NAVY LIFE TO REENLISTMENT DECISIONS

Jean W. Fletcher
Kurt L. Giesler



Institute of Naval Studies

CENTER FOR NAVAL ANALYSES

2000 North Beauregard Street, Alexandria, Virginia 22311

ABSTRACT

Attitudes toward both compensation and non-monetary attributes of military life were used to predict reenlistment decision for a variety of Navy ratings. Both quantifiable job characteristics (such as medical and recreation services, liberty time, and housing availability) and intangible characteristics (such as job challenge, guidance, and autonomy) were included in the analyses. The identification of sources of discontent that adversely affect reenlistment probability provides potential alternatives to compensation for personnel management.

SUMMARY

The Navy has devoted much effort in recent years to improving the quality of Navy life. Funding has been increased for counselling, recreation, shipboard habitability, and other programs designed to improve morale. Identification of the effects of attitudes toward Navy working and living conditions on reenlistment decisions can provide guidelines for allocation of quality of life program funds.

The Navy Occupational Task Analysis Program (NOTAP) survey collects data from representative samples of personnel working in each Navy rating. NOTAP data contains detailed information on attitudes toward Navy life. Respondents provide evaluations of pay, housing, training, supervision, and other facets of Navy life. NOTAP data, supplemented by data from Enlisted Master Records, provide information necessary to relate expressed attitudes toward Navy life to subsequent reenlistment decision.

The study population was composed of personnel in the hospital corpsman (HM), aviation electricians mate (AE), aviation structural mechanic (AM), aviation electronics technician (AT), aviation antisubmarine warfare operator (AW), and mess management specialist (MS) ratings. These ratings had relatively recent NOTAP surveys, adequate sample sizes, and covered a range of technical and non-technical jobs.

Factor Analysis was used to reduce the data to manageable proportions. From the 67 NOTAP job satisfaction items, three broad categories of factors were identified. They were pay, quality of job, and quality of military life. Quality of job factors included autonomy, physical work environment, skill utilization, team effort, and relationships with peers, supervisors, and subordinates. Quality of military life factors included deployment time, housing, duty station, medical services, and ship habitability. The factors were generated independently, but are intuitively appealing and very consistent across ratings.

A trinomial logit model was used to estimate the probability of making each of three choices (leave, extend, reenlist) as functions of demographic variables, military job, life, and pay factors, and service controls. Separate estimates were obtained for first-term and career personnel. First term results show that pay is consistently important in retaining first-term personnel. Satisfaction with the job factors, which can generally be improved by effective leadership and personnel management, is also related to increased probability of reenlisting or extending. The significant factors vary by rating, but this is not surprising given the diversity of job content across ratings.

The military life factors are more tangible and identifiable with Navy Quality of Life programs. With few exceptions, they are not related to first-term reenlistment. However, a very different picture

emerges for career personnel. There are still some significant job factors in the reenlistment equation, but there is a marked increase in the number of military life factors that significantly increase reenlistment probability. Duty station choice, housing, and medical services are important in the career reenlistment decision across several ratings.

In summary, the use of pay in the past to increase reenlistments is once more justified. Beyond that, improvements in personnel management may improve retention for first-termers, while further improvements in the quality of military life will have the greatest retention payoff if expenditures and programs are targeted toward career personnel.

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INTRODUCTION

BACKGROUND

The Navy has devoted much effort in recent years to improving the quality of Navy life (QOL). Funding has been increased for family counselling, recreation, shipboard habitability, and other programs designed to improve morale. This study examines the influence of attitudes toward Navy life on reenlistment behavior. Knowledge of the relationship between attitudes toward Navy working and living conditions and reenlistment probability is doubly valuable. It identifies potential policy tools for personnel management, and provides guidelines for allocation of QOL funds.

The Navy Occupational Task Analysis Program (NOTAP) is a detailed survey of job tasks and attitudes toward characteristics of Navy service. It is administered in six-year cycles to representative samples of personnel working in each Navy rating. NOTAP data was merged with Enlisted Master Record (EMR) data to relate expressed attitudes toward Navy life and jobs to subsequent reenlistment decision. Reference 1 presents the results of a preliminary analysis. It also contains a detailed description of both data bases, the data extraction methodologies, and a brief QOL literature review.

The reenlistment model is used to estimate the probability of making each of three choices (leave, extend, reenlist) from attitudinal and demographic variables. Separate estimates are obtained for first-term and career (beyond first-term) decision probabilities.

This report is structured as follows. The data reduction section describes the NOTAP data and the factor analysis methods used to obtain the job and military life factors for input into the reenlistment model. The next section reports the results of model estimation, and the final section considers the implications of these results and provides a perspective on potential extensions of research on QOL and retention.

DATA REDUCTION

QOL attitudinal data was extracted from NOTAP survey information, and reenlistment decisions were inferred from corresponding EMRs (see [1]). EMRs also provided a ready source of demographic information on each survey respondent. Responses to NOTAP job satisfaction items ranged from one (very dissatisfied) to seven (very satisfied). Table 1 lists the survey items and gives the mean response for each of the three surveys used. Separate NOTAP surveys were given to each rating, and the length of the survey varied across ratings. HMs evaluated 37 job satisfaction items; MSs and the aviation ratings dealt with 65 and 67, respectively. For this reason, and because satisfaction patterns were believed to differ among groups, the study population was initially

TABLE 1
NOTAP JOB SATISFACTION ITEMS

Job satisfaction item	Questionnaire mean response			Item abbreviation
	HM	Aviation	MS	
Opportunity for advancement	3.7	4.5	4.3	ADVANCE
Prestige and status	3.4	3.6	3.9	STATUS
Opportunity for worthwhile work	4.7	4.5	4.5	WORTH
Recognition for work done	3.4	3.5	4.0	RECOGNITION
Job appeal	4.2	4.1	4.1	APPEAL
Job challenge	4.4	4.6	4.4	CHALLENGE
Adequate tools	3.8	4.0	4.0	TOOLS
Repair parts and supplies	-- ^a	3.6	3.6	PARTS
Freedom to do entire job	4.5	4.5	4.4	ENTIRE
Variety of work	-- ^a	4.5	4.4	VARIETY
Opportunity to see work results	4.7	4.8	5.1	RESULTS
Opportunity to contribute to team effort	4.4	5.0	5.0	TEAMWORK
Acceptance of suggestions	4.2	4.0	3.9	VOICE
Opportunity to help others	5.2	4.9	5.2	SERVICE
Job pressures	3.0	3.2	3.6	PRESSURE
Frequent job changes within activity	4.1	3.9	3.7	CHANGES
Guidance received	3.7	4.1	4.1	GUIDANCE
On-the-job training	4.4	4.9	4.5	OJT
Formal school training	3.9	4.2	3.7	SCHOOL
Opportunity to demonstrate capabilities	4.5	4.8	4.7	DEMONSTRATE
Opportunity to make decisions	-- ^a	4.1	4.1	DECIDE
Qualifications-job match	4.0	4.3	4.1	SKILLMATCH
Competence of supervisors	4.2	4.3	4.2	SUPCOMP
Working relationship with supervisors	4.6	4.7	4.7	SUPREL
Competence of peers	-- ^a	4.7	4.6	PEERCOMP
Working relationships with peers	-- ^a	5.1	5.0	PEERREL
Competence of subordinates	4.4	4.4	4.4	SUBCOMP
Working relationships with subordinates	5.0	4.8	4.7	SUBREL
Safety of work environment	4.5	4.7	4.0	SAFETY
Comfort of work environment	-- ^a	3.6	4.0	COMFORT
Utilization of government money	3.0	3.0	4.0	DOLUTIL
Utilization of government material	3.4	3.6	4.3	MATUTIL

TABLE 1 (Cont'd)

Job satisfaction item	Questionnaire mean response			Item abbreviation
	HMAviation	MS		
Utilization of personnel	2.8	3.5	4.1	PERSUTIL
Utilization of time	-- ^a	4.0	4.8	TIMEUTIL
Stability of command schedule	-- ^a	4.0	4.8	STABILITY
Tempo of job activity	4.0	3.9	4.2	TEMPO
Work hours at sea	-- ^a	3.7	4.4	SEAWORK
Watch hours at sea	-- ^a	3.6	4.2	SEAWATCH
Work hours in port	-- ^a	4.0	4.6	PORTWORK
Watch hours in port	-- ^a	3.8	4.2	PORTWATCH
Duty hours in port	-- ^a	3.9	4.3	PORTDUTY
Liberty in home port	4.1	4.4	4.5	PORTLIB
Liberty away from home port	-- ^a	3.7	3.7	DEPLIB
Time on deployment	-- ^a	3.6	3.9	DEPLOY
Time on TAD/TDX	-- ^a	3.6	3.1	TAD
Opportunity to select duty station	2.4	3.0	3.1	DUTYSTA
Opportunity to select duty type	-- ^a	3.1	3.3	DUTYTYPE
Present duty station	3.2	3.9	3.8	PRESDUTY
Pay/allowances	2.8	2.8	3.6	PAY
BEQ/barracks	2.4	2.5	3.5	BEQ
Shipboard living spaces	2.4	2.2	3.0	SHIPLIVE
Availability of on-base housing	-- ^a	2.4	2.6	AMILHOUS
Quality of on-base housing	-- ^a	3.0	3.0	QMILHOUS
Adequacy of on-base housing	2.4	-- ^a	-- ^a	ADMHOUS
Availability of off-base housing	-- ^a	3.8	3.5	ACIVHOUS
Quality of off-base housing	-- ^a	4.0	4.0	QCIVHOUS
Adequacy of off-base housing	3.3	-- ^a	-- ^a	ADCHOUS
Navy exchange/PX/ship's store	-- ^a	3.7	4.7	PX
Commissary	-- ^a	3.9	4.6	COMMISSARY
Recreation services	-- ^a	4.1	4.6	RECSERV
Dental services	-- ^a	4.3	4.3	DENTAL
Medical services	-- ^a	3.7	4.1	MED
Medical services (dependents)	-- ^a	3.0	3.4	MEDDEPS
Retirement plan	-- ^a	3.3	3.7	RETIRE
Counselling services	-- ^a	3.3	3.4	COUNSEL
Opportunity to travel	2.6	-- ^a	-- ^a	TRAVEL
Length of sea tour	-- ^a	3.3	-- ^a	SEATOUR
Length of shore tour	-- ^a	3.8	-- ^a	SHORETOUR
Overall job	4.2	4.3	4.4	JOB
Overall military career	3.7	3.7	4.2	CAREER

^aQuestion not included in survey for this rating.

divided into three sub-samples.* To simplify tabular presentations, each survey item will henceforth be referred to by the abbreviation shown in the last column of table 1.

Since the objective of our analysis was identification of dissatisfaction which adversely affects reenlistment probability, the NOTAP survey items were rescaled. Each individuals mean response was used as a base, and, for each NOTAP item, a new variable was created which takes the value one if individual is relatively dissatisfied with the item (i.e. one standard deviation or more below the base). Use of this procedure captures item-specific or relative dissatisfaction.

Table 2 gives an overview of the distribution of the rescaled items. An asterisk means that at least 25 per cent of the personnel in the given rating are relatively dissatisfied with that attribute. Only 16 NOTAP items have such high dissatisfaction responses in any rating. Job pressure, duty choices, pay, and housing are sources of dissatisfaction across ratings and term of service. A complete report of dissatisfaction response rate by reenlistment choice by rating can be found in appendix A, tables A-1 through A-4.

Because of the unwieldy number of NOTAP survey items and the high correlation among many of the items, factor analysis was employed as a means of reducing the data to manageable proportions. (See [2] for a description of factor analytic techniques.) Factor analysis is a data reduction technique of particular appeal in the treatment of attitudinal variables. It assumes that a broad range of observed data can be redefined and adequately described in terms of a much smaller number of underlying dimensions called factors. The factors generated are weighted, linear combinations of original data items. Each factor captures common variance of the items upon which it is based, and the factors are uncorrelated.

Tables 3 through 5 list the data items included in each factor for each rating. Appendix B details the factor analysis results. The factors generated can be grouped into two broad categories: those that deal with conditions of the job performed and those that are intrinsic to military life regardless of particular job assignment. The job- and military-specific factors were generated independently for each rating group. The factors are intuitively appealing and similar across ratings. These factors, rather than the individual NOTAP items, are used in the reenlistment model.

* The aviation ratings were subsequently divided into the AE-AM and AT-AW groups for whom results are reported in later sections.

TABLE 2
NOTAP ITEMS WITH DISSATISFACTION RESPONSE RATE > .25

	First term			Beyond first term			
	<u>AE/AM</u>	<u>AT/AW</u>	<u>HM</u>	<u>AE/AM</u>	<u>AT/AW</u>	<u>HM</u>	<u>MS</u>
RECOGNITION		*					
PRESSURE	*	*	*	*	*	*	*
SCHOOL						*	
DOLUTIL	*	*			*		
PERSUTIL		*	*				
STABILITY		*			*		
DUTY STATION	*	*	*	*	*	*	*
DUTY TYPE	*	*					
PRES DUTY			*		*		
PAY	*	*	*	*	*	*	*
BEQ	*	*	*				
SHIPLIVE	*	*		*	*		
AMILHOUS	*	*		*	*	*	*
MEDDEPS				*	*		
SEATOUR		*					
TRAVEL		*			*		

TABLE 3
FACTOR ANALYSIS RESULTS: HM

<u>NOTAP Items</u>	
Quality of job factors:	
Training opportunities	OJT, SCHOOL, GUIDANCE
Meaningful work	WORTH, APPEAL, CHALLENGE
Team effort	TEAMWORK, SERVICE
Relations with supervisors	SUPCOMP, SUPREL
Relations with subordinates	SUBCOMP, SUBREL
Faith in the organization	MATUTIL, DOLUTIL, PERSUTIL
Adequate tools	TOOLS, SAFETY
Skill utilization	SKILLMATCH, DEMONSTRATE, CHALLENGE
Autonomy	ENTIRE, PRESSURE
Recognition/Prestige	RECOGNITION, STATUS
Quality of military life factors:	
Housing	ADMHOUS, ADCHOUS
Duty assignments/station	DUTYSTA, PRESDUTY
Barracks/ship habitability	BEQ, SHIPLIVE, PORTLIB

TABLE 4
FACTOR ANALYSIS RESULTS: AVIATION RATINGS

<u>NOTAP Items</u>	
Quality of job factors:	
Training opportunities	OJT, SCHOOL, GUIDANCE
Physical work environment	COMFORT, SAFETY
Meaningful work	WORTH, APPEAL, CHALLENGE, VARIETY
Team effort	TEAMWORK, RESULTS, SERVICE
Relations with superiors	SUPCOMP, SUPREL
Relations with co-workers	PEERCOMP, PEERREL, SUBCOMP, SUBREL
Faith in the organization	MATUTIL, DOLUTIL, PERSUTIL
Adequate tools	TOOLS, PARTS
Skill utilization	SKILLMATCH, DECIDE, VOICE DEMONSTRATE
Autonomy	PRESSURE, CHANGES
Personnel utilization	TIMEUTIL, PERSUTIL, TEMPO
Recognition/prestige	RECOGNITION, STATUS
Quality of military life factors:	
Housing	AMILHOUS, QMILHOUS, ACIVHOUS, QCIVHOUS
Duty assignments/station	DUTYSTA, DUTYTYPE
Deployment time	DEPLOY, PORTLIB, DEPLIB, SHIPLIVE
Work schedule (home)	PORTWORK, PORTWATCH, PORTDUTY
Work schedule (deployed)	SEAWORK, SEAWATCH, SHIPLIVE
Medical services	DENTAL, MED, MEDDEPS
Family services	PX, COMMISSARY, RECSERV
Barracks/ship habitability	BEQ, SHIPLIVE

TABLE 5
FACTOR ANALYSIS RESULTS: MS

NOTAP Items	
Quality of job factors:	
Training opportunities	OJT, SCHOOL, GUIDANCE
Physical work environment	COMFORT, SAFETY
Meaningful work	WORTH, APPEAL, CHALLENGE, VARIETY, ENTIRE, RECOGNITION
Team effort	TEAMWORK, SERVICE, RESULTS
Relations with co-workers	PEERCOMP, PEERREL, SUPCOMP, SUPREL, SUBCOMP
Relations with subordinates	SUBCOMP, SUBREL
Faith in the organization	MATUTIL, DOLUTIL, PERSUTIL
Adequate tools	TOOLS, PARTS
Skill utilization	SKILLMATCH, DEMONSTRATE, DECIDE, VOICE
Autonomy	PRESSURE, CHANGES
Recognition/prestige	STATUS, ADVANCE
Quality of military life factors:	
Military housing	AMILHOUS, QMILHOUS, ACIVHOUS, QCIVHOUS, BEQ
Duty assignments/station	DUTYSTA, DUTYTYPE, TAD
Deployment time	DEPLOY, TAD, DEPLIB, PORTLIB, SHIPLIVE
Work schedule (home)	PORTDUTY, PORTWORK, PORTWATCH, PORTLIB
Work schedule (deployed)	SEAWORK, SEAWATCH
Medical services	DENTAL, MED, MEDDEPS, COUNSEL
Family services	PX, COMMISSARY, RECSERV
Career support services	RETIRE, COUNSEL

RELATING QOL FACTORS TO REENLISTMENT PROBABILITY

In [1], the simple correlations between NOTAP responses and reenlistment decision were examined, and the mean responses for each satisfaction item were compared across ratings. These were informative, but neither knowing the sources of most complaints nor comparing simple correlations gives the whole story. The net effect of QOL attitudes on reenlistment decision after controlling for demographics is our objective. To obtain it, the QOL factors calculated from the factor analysis results are incorporated into a model of the reenlistment decision.

REENLISTMENT MODEL

Our model for estimating reenlistment decision probabilities was chosen based on two patterns illustrated in table 6. First, as expected, reenlistment rates differ dramatically between first and subsequent decisions. This is not a new observation--the sequential self-selection process and lure of retirement benefits produce a greater average preference for military over civilian service as a cohort ages. For each of our ratings (except MS, whose sample size is too small), separate estimation of first-term and later decision parameters will be performed.

TABLE 6
REENLISTMENT DECISION DISTRIBUTION BY TERM

<u>Rating (cases)</u>		<u>% Leave</u>	<u>% Extend</u>	<u>% Reenlist</u>
HM	First (2042)	79	8	13
	Subseq (726)	39	20	41
AE/AM	First (949)	82	9	9
	Subseq (464)	35	40	25
AT/AW	First (536)	72	11	17
	Subseq (308)	30	59	11
MS	All Terms (417)	44	18	38

A second striking feature in table 6 is the large number of extenders, especially among subsequent-term aviation personnel. Extending may not express a career commitment. Therefore, we treated extending as a distinct alternative to reenlisting or leaving in a trinomial logit model described in appendix C. We estimated the probabilities of making each of three choices (leave, extend, reenlist), using as arguments our

job and military life factors, as well as pay composites and demographic and service-related control variables.

RESULTS OF MODEL ESTIMATION

Summary results by term of service are shown in tables 7 through 10. These show the direction of significant QOL factor effects on extension and reenlistment probability. Thus, for first-term HMs, being dissatisfied with job autonomy decreases the probability of reenlisting. In many cases, factors have opposite effects for reenlistment and extension probabilities.

In general, the job factors are rather intangible. They represent facets of the job which can usually be improved through effective leadership and personnel management. Across ratings, autonomy, recognition and considering work meaningful affect retention.

The military factors are potentially easier to quantify than the job factors. Examination of NOTAP regression in tables A-1 through A-4 shows enlisted personnel to be generally dissatisfied with items that comprise the military factors. Yet, with the exceptions of medical services, the extension and reenlistment probabilities of first-term personnel are not consistently related in the expected way to the military factors. The story is somewhat different for career personnel. Duty station choice is significantly related to reenlistment probability for every rating studied. Housing and deployment time enter the retention equations for two of the four groups. Dissatisfaction with pay increases extension probability while decreasing reenlistment probability in the first-term for HMs and the AT/AW group. The attitude toward pay enters variously for the other ratings, but alternative specifications using actual military compensation produce significant coefficients for pay in all ratings and terms, excepting the MS rating.

Demographic effects are summarized in table 11. Nonwhites have greater first-term reenlistment probability for every rating studied. The same is true for personnel with dependents. Education and mental group are important predictors of pre-contract attrition in the first term (see [3]), but they are not consistently related to reenlistment probability in our sample.

TABLE 7
RESULTS OF TRINOMIAL CHOICE MODEL: HM

Independent variable	Effect of dissatisfaction on choice probability			
	First term		Second term and beyond	
	Extend	Reenlist	Extend	Reenlist
Quality of job factors:				
Training opportunities		+	+	
Physical work environment				
Meaningful work			-	
Team effort			-	+
Relations with supervisors	-	+		
Relations with subordinates				
Faith in the organization		-		
Adequate tools				
Skill utilization				
Autonomy		-		
Personnel utilization				
Recognition/prestige		-	-	
Quality of military life factors:				
Military housing	+			+
Duty assignments/station	+			-
Deployment time		-		
Work schedule (home)				
Work schedule (deployed)				
Medical services				
Family services				
Career support services				
Barracks/ship habitability			+	
Attitude toward pay	+	-		

TABLE 8

RESULTS OF TRINOMIAL CHOICE MODEL: AT/AW

Independent variable	Effect of dissatisfaction on choice probability			
	First term		Second term and beyond	
	Extend	Reenlist	Extend	Reenlist
Quality of Job Factors:				
Training opportunities			-	
Physical work environment			-	
Meaningful work	-		+	
Team effort				
Relations with coworkers				
Relations with subordinates				+
Faith in the organization			+	-
dequate tools				
Skill utilization				
Autonomy				-
Personnel utilization	-	-		+
Recognition/prestige				-
Quality of military life factors:				
Housing			-	
Duty assignments/station	+		-	-
Deployment time				
Work schedule (home)				+
Work schedule (deployed)				
Medical services	-	+		
Family services				
Career support services				
Barracks/ship habitability	-		-	
Attitude toward pay	+	-		

TABLE 9
RESULTS OF TRINOMIAL CHOICE MODEL: AM/AE

Independent variable	Effect of dissatisfaction on choice probability			
	First term		Second term and beyond	
	Extend	Reenlist	Extend	Reenlist
Quality of job factors:				
Training opportunities	+		-	+
Physical work environment				+
Meaningful work	-	+		
Team effort				+
Relations with coworkers				
Relations with superiors				
Faith in the organization				
Adequate tools		+		
Skill utilization	+			
Autonomy		-		
Personnel utilization	+	-	+	
Recognition/prestige	-			+
Quality of military life factors:				
Housing		+	+	-
Duty assignments/station				-
Deployment time	+		+	
Work schedule (home)				
Work schedule (deployed)				
Medical services		-		
Family services	-			
Barracks/ship habitability		+		
Attitude toward pay				

TABLE 10
RESULTS OF TRINOMIAL CHOICE MODEL: MS

<u>Independent variable</u>	<u>Effect of dissatisfaction on choice probability</u>	
	<u>All terms of service</u>	<u>Reenlist</u>
	<u>Extend</u>	<u>Reenlist</u>
Quality of job factors:		
Training opportunities		
Physical work environment		
Meaningful work	-	
Team effort		
Relations with co-workers		
Relations with subordinates	+	-
Faith in the organization	+	
Adequate tools		
Skill utilization		-
Autonomy		-
Recognition/prestige		-
Quality of military life factors:		
Military housing	+	
Duty assignments/station	-	-
Deployment time		-
Work schedule (home)		
Work schedule (deployed)		
Medical services	-	
Family services		
Career support services	-	
Attitude toward pay	-	+

TABLE 11

SUMMARY RESULTS OF THE EFFECTS OF DEMOGRAPHIC CONTROLS
ON THE REENLISTMENT DECISION

Variable	First-Term										Career					
	HM		AT/AW		AE/AM		HM		AT/AW		AE/AM		HM		AT/AW	
	Extend	Reup	Extend	Reup	Extend	Reup	Extend	Reup	Extend	Reup	Extend	Reup	Extend	Reup	Extend	Reup
Race=nonwhite	+	+	+	+	+	+	-	-	-	-	-	-	-	-	+	+
Sex=female	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education > high school	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Education < high school	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dependents	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Mental Group = 1 or 2	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Mental Group = 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mental Group = 4 or 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mental Group = 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

IMPLICATIONS FOR RETENTION POLICIES

Our QOL analysis has shown that pay is important in reenlistment decisions, that the intangible quality of job factors affect choices for both first-termers and careerists, and that some of the potentially manipulable military life factors affect career decisions. These results are interesting and lend promise to the idea of retention payoffs to QOL programs, particularly for the critical careerists. However, more work is needed. To make optimal decisions about QOL spending as a retention tool, the military factors would have to be quantified. Our results show that increasing satisfaction with duty choices will increase retention--the big gap is the translation between increasing satisfaction and the cost of doing so. The summary results reported included only information on sign and significance of factors, because the actual coefficients or partial effects are not readily useful. An empirical result that a ten percent increase in satisfaction with military housing will increase the retention rate by one percent says nothing about how to change those attitudes. The work reported here is valuable in focusing our consideration of QOL areas for improving these six ratings. Clearly much more has to be done. There are differences across ratings in QOL factor effects, and there remains the problem of quantifying these effects.

There are two promising avenues for continuing this work. The first involves devising a QOL-specific survey. The NOTAP survey was designed primarily as a task analysis data source with scaled job satisfaction responses included. In a survey specifically designed to evaluate QOL program alternatives, actual data (such as number of moves, deployment times, housing type and cost, and labor force status of spouse) could be obtained. Such data would allow direct estimation of retention gains from QOL changes, and these could be compared to the costs of the changes.

Alternatively, a piecemeal approach of data collection for specific QOL areas could be followed. Examples include evaluation of duty station choice programs and amassing individual deployment histories to relate sea duty to reenlistment probability.

In summary, the use of pay to increase reenlistments is once more justified, but other non-monetary aspects of military jobs also affect reenlistments. There remains the task of quantifying the cost of increasing reenlistment rates through the quality of Navy life improvements. Accomplishing this would allow the Navy to design a total compensation package that achieves the necessary level of retention as efficiently as possible.

REFERENCES

- [1] Center for Naval Analyses, Memorandum 81-1181, "A Preliminary Look at Navy Job Satisfaction and Reenlistment," by Sean W. Fletcher and Kurt L. Giesler, Unclassified, Jul 1981
- [2] Harmon, Harry. Modern Factor Analysis, Chicago: The University of Chicago Press, 1967
- [3] Center for Naval Analyses, Research Contribution 450, "Continuous Estimates of Survival Through Eight Years of Service using FY 1979 Cross-Sectional Data," by Philip M. Lurie, Unclassified, Jul 1981

APPENDIX A

**RESCALED NOTAP ITEM DISSATISFACTION
RESPONSE RATES**

TABLE A-1

FRACTION OF AE/AM SAMPLE WITH
DISSATISFIED RESPONSE TO RESCALED NOTAP ITEMS

	First Term			Beyond First Term		
	Leave	Extend	Reup	Leave	Extend	Reup
ADVANCE	.07	.06	.07	.16	.07	.12
STATUS	.17	.13	.18	.14	.16	.19
WORTH	.07	.01	.07	.04	.05	.03
RECOGNITION	.22	.16	.22	.20	.19	.23
APPEAL	.11	.07	.20	.15	.09	.09
CHALLENGE	.08	.01	.08	.09	.06	.06
TOOLS	.16	.19	.19	.18	.19	.17
PARTS	.15	.22	.27	.12	.19	.21
ENTIRE	.07	.11	.16	.07	.08	.10
VARIETY	.07	.08	.07	.09	.05	.08
RESULTS	.03	.01	.06	.03	.04	.08
TEAMWORK	.02	.05	.02	.02	.03	.03
VOICE	.11	.09	.09	.07	.08	.10
SERVICE	.03	.02	.02	.03	.02	.03
PRESSURE	.26	.28	.20	.23	.30	.31
CHANGES	.15	.10	.15	.15	.16	.16
GUIDANCE	.09	.10	.07	.12	.11	.19
OJT	.04	.06	.06	.07	.07	.08
SCHOOL	.16	.16	.18	.22	.19	.24
DEMONSTRATE	.06	.06	.07	.06	.05	.06
DECIDE	.12	.19	.21	.10	.15	.09
SKILLMATCH	.09	.08	.09	.09	.05	.08
SUPCOMP	.08	.09	.12	.07	.11	.09
SUPREL	.08	.06	.05	.06	.05	.03
PEERCOMP	.06	.08	.09	.04	.02	.07
PEERREL	.03	.02	.09	.03	.03	.02
SUBCOMP	.06	.07	.06	.02	.08	.05
SUBREL	.05	.06	.05	.02	.04	.03
SAFETY	.08	.06	.04	.04	.07	.03
COMFORT	.22	.15	.18	.14	.20	.20
DOLUTIL	.26	.28	.27	.24	.24	.23
MATUTIL	.16	.19	.16	.17	.17	.12
PERSUTIL	.17	.22	.09	.16	.18	.13
TIMEUTIL	.11	.13	.08	.07	.16	.08
STABILITY	.22	.24	.16	.24	.22	.19
TEMPO	.10	.09	.06	.07	.08	.08
SEAWORK	.15	.10	.11	.14	.13	.12
SEAWATCH	.15	.15	.12	.09	.10	.14
PORTWORK	.11	.14	.09	.14	.15	.12

TABLE A-1 (Cont'd)

	First Term			Beyond First Term		
	<u>Leave</u>	<u>Extend</u>	<u>Reup</u>	<u>Leave</u>	<u>Extend</u>	<u>Reup</u>
PORTWATCH	.16	.23	.18	.09	.15	.13
PORTDUTY	.12	.10	.11	.08	.12	.12
PORTLIB	.08	.10	.08	.06	.09	.08
DEPLIB	.12	.16	.16	.06	.13	.11
DEPLOY	.13	.19	.14	.14	.20	.17
TAD	.17	.25	.15	.13	.17	.16
DUTYSTA	.26	.28	.25	.28	.27	.24
DUTYTYPE	.24	.28	.24	.23	.27	.21
PRESDUTY	.17	.16	.16	.35	.39	.31
PAY	.30	.34	.29	.19	.17	.13
BEQ	.29	.30	.39	.18	.24	.21
SHIPLIVE	.30	.33	.31	.25	.31	.25
AMILHOUS	.27	.25	.31	.28	.30	.25
QMILHOUS	.16	.14	.19	.19	.20	.19
ACIVHOUS	.12	.15	.16	.21	.20	.13
QCIVHOUS	.09	.07	.21	.13	.16	.08
PX	.15	.10	.18	.20	.22	.23
COMMISSARY	.11	.10	.12	.17	.15	.19
RECSERV	.11	.06	.12	.07	.12	.09
DENTAL	.14	.11	.14	.14	.11	.10
MED	.22	.17	.14	.24	.17	.19
MEDDEPS	.22	.24	.24	.36	.36	.29
RETIRE	.20	.16	.19	.22	.20	.21
COUNSEL	.16	.14	.15	.16	.17	.14
SEATOUR	.08	.11	.05	.06	.11	.08
SHORETOUR	.05	.11	.04	.03	.07	.03

TABLE A-2
FRACTION OF AT/AW SAMPLE WITH DISSATISFIED
RESPONSE TO RESCALED NOTAP ITEMS

	First Term			Beyond First Term		
	<u>Leave</u>	<u>Extend</u>	<u>Reup</u>	<u>Leave</u>	<u>Extend</u>	<u>Reup</u>
ADVANCE	.11	.10	.06	.16	.09	.15
STATUS	.20	.21	.24	.23	.17	.06
WORTH	.10	.07	.05	.04	.08	.09
RECOGNITION	.24	.28	.27	.32	.20	.18
APPEAL	.18	.10	.05	.15	.12	.12
CHALLENGE	.07	.07	.06	.11	.10	.03
TOOLS	.13	.16	.14	.17	.13	.15
PARTS	.13	.22	.23	.16	.13	.24
ENTIRE	.06	.03	.03	.10	.03	.15
VARIETY	.13	.14	.13	.08	.09	.09
RESULTS	.09	.14	.09	.08	.06	.03
TEAMWORK	.03	0	.05	.01	.02	.03
VOICE	.11	.17	.16	.18	.10	.06
SERVICE	.03	.03	.05	.08	.03	.03
PRESSURE	.26	.26	.24	.35	.31	.26
CHANGES	.16	.24	.18	.19	.11	.15
GUIDANCE	.12	.14	.17	.20	.13	.24
OJT	.06	.14	.04	.11	.07	.18
SCHOOL	.11	.07	.21	.14	.14	.12
DEMONSTRATE	.07	.07	.07	.06	.05	.09
DECIDE	.13	.19	.12	.08	.14	.09
SKILLMATCH	.15	.10	.14	.10	.11	.12
SUBCOMP	.12	.10	.11	.09	.07	.03
SUPREL	.07	.09	.06	.08	.04	.03
PEERCOMP	.03	.03	.05	.05	.03	.03
PEERREL	.02	.03	.02	0	.01	.03
SUBCOMP	.05	.05	.03	.02	.04	.09
SUBREL	.04	.05	.01	0	.02	0
SAFETY	.04	.05	.04	.05	.04	0
COMFORT	.18	.19	.20	.23	.14	.15
DOLUTIL	.33	.31	.37	.35	.34	.24
MATUTIL	.23	.21	.19	.19	.21	.24
PERSUTIL	.27	.29	.21	.19	.19	.35
TIMEUTIL	.26	.19	.14	.13	.15	.24
STABILITY	.35	.38	.28	.26	.34	.29
TEMPO	.13	.03	.12	.11	.07	.03
SEAWORK	.14	.19	.16	.16	.13	.12
SEAWATCH	.10	.14	.09	.12	.15	.09
PORTWORK	.09	.21	.17	.06	.10	.06

TABLE A-2 (Cont'd)

	First Term			Beyond First Term		
	Leave	Extend	Reup	Leave	Extend	Reup
PORWATCH	.13	.12	.14	.08	.11	.15
PORTDUTY	.11	.16	.07	.08	.09	.18
PORTLIB	.06	.05	.04	.05	.05	.06
DEPLIB	.08	.12	.06	.06	.09	.03
DEPLOY	.17	.12	.15	.22	.19	.12
TAD	.16	.21	.12	.17	.17	.12
DUTYSTA	.32	.43	.33	.35	.23	.21
DUTYTYPE	.27	.40	.30	.28	.18	.21
PRESDUTY	.14	.17	.11	.14	.14	.18
PAY	.45	.55	.43	.56	.48	.56
REQ	.36	.33	.30	.23	.25	.21
SHIPLIVE	.30	.24	.26	.38	.28	.35
AMILHOUS	.25	.28	.31	.25	.34	.21
QMILHOUS	.16	.10	.16	.13	.16	.15
ACIVHOUS	.11	.14	.14	.13	.14	.12
QCIVHOUS	.06	.14	.10	.11	.12	.06
PX	.13	.19	.14	.20	.22	.35
COMMISSARY	.09	.10	.15	.15	.15	.15
RECSERV	.08	.10	.12	.08	.09	.15
DENTAL	.06	.05	.11	.04	.12	.12
MED	.13	.10	.22	.20	.18	.24
MEDDEPS	.14	.21	.26	.41	.33	.44
RETIRE	.19	.21	.11	.18	.16	.12
COUNSEL	.14	.12	.10	.11	.18	.18
SEATOUR	.25	.26	.22	.20	.23	.21
SHORETOUR	.17	.22	.20	.13	.19	.09

TABLE A-3
FRACTION OF HM SAMPLE WITH DISSATISFIED
RESPONSE TO RESCALED NOTAP ITEMS

	First Term			Beyond First Term		
	Leave	Extend	Reup	Leave	Extend	Reup
ADVANCE	.13	.17	.10	.20	.17	.19
STATUS	.17	.14	.12	.16	.10	.13
WORTH	.05	.08	.06	.05	.01	.03
RECOGNITION	.21	.17	.16	.23	.13	.23
APPEAL	.09	.07	.08	.09	.05	.10
CHALLENGE	.10	.09	.09	.11	.12	.08
TOOLS	.11	.13	.12	.15	.16	.20
ENTIRE	.06	.05	.07	.10	.10	.06
RESULTS	.06	.04	.06	.04	.06	.03
TEAMWORK	.04	.04	.03	.06	.01	.05
VOICE	.08	.07	.03	.09	.05	.05
SERVICE	.02	.01	.02	.01	.02	.02
PRESSURE	.26	.26	.21	.26	.31	.32
CHANGES	.14	.16	.14	.14	.13	.10
GUIDANCE	.09	.11	.17	.19	.21	.19
OJT	.07	.09	.09	.13	.17	.14
SCHOOL	.18	.16	.20	.09	.19	.14
DEMONSTRATE	.05	.06	.06	.04	.02	.05
SKILLMATCH	.12	.10	.13	.11	.11	.12
SUPCOMP	.09	.05	.09	.08	.06	.08
SUPREL	.05	.02	.04	.02	.04	.05
SUBCOMP	.04	.02	.03	.03	.06	.04
SUBREL	.01	.01	.01	.01	.01	.02
SAFETY	.05	.07	.06	.07	.10	.07
DOLUTIL	.24	.20	.20	.22	.19	.20
MATUTIL	.18	.14	.12	.14	.15	.16
PERSUTIL	.29	.23	.23	.26	.23	.21
TEMPO	.09	.10	.05	.07	.09	.11
PORLIB	.06	.13	.07	.08	.12	.11
DUTYSTA	.42	.50	.39	.47	.47	.40
PRESDUTY	.26	.24	.27	.25	.23	.25
PAY	.28	.31	.24	.36	.34	.32
BEQ	.32	.32	.36	.23	.26	.22
SHIPLIVE	.13	.16	.13	.12	.19	.17
AMILHOUS	.20	.30	.25	.22	.30	.27
QMILHOUS	.15	.22	.19	.17	.16	.24
TRAVEL	.38	.35	.30	.39	.26	.32

TABLE A-4
FRACTION OF MS SAMPLE WITH DISSATISFIED
RESPONSE TO RESCALED NOTAP ITEMS

	All Terms		
	<u>Leave</u>	<u>Extend</u>	<u>Reup</u>
ADVANCE	.11	.23	.20
STATUS	.20	.13	.11
WORTH	.08	.03	.09
RECOGNITION	.18	.08	.17
APPEAL	.18	.04	.11
CHALLENGE	.14	.08	.11
TOOLS	.17	.17	.22
PARTS	.15	.25	.20
ENTIRE	.09	.07	.08
VARIETY	.14	.11	.11
RESULTS	.05	.04	.05
TEAMWORK	.05	.03	.05
VOICE	.20	.11	.18
SERVICE	.04	.03	.01
PRESSURE	.27	.15	.22
CHANGES	.22	.27	.20
GUIDANCE	.09	.12	.15
OJT	.08	.11	.14
SCHOOL	.23	.33	.25
DEMONSTRATE	.07	.09	.07
DECIDE	.17	.17	.11
SKILLMATCH	.20	.16	.13
SUPCOMP	.15	.07	.11
SUPREL	.09	.05	.04
PEERCOMP	.07	.08	.06
PEERREL	.07	.03	.02
SUBCOMP	.07	.08	.04
SUBREL	.05	.12	.04
SAFETY	.04	.05	.05
COMFORT	.15	.17	.12
DOLUTIL	.16	.20	.13
MATUTIL	.13	.13	.07
PERSUTIL	.15	.12	.07
TIMEUTIL	.08	.04	.04
STABILITY	.13	.07	.10
TEMPO	.07	.05	.09
SEAWORK	.15	.09	.10
SEAWATCH	.15	.08	.07
PORTWORK	.08	.07	.06
PORTWATCH	.14	.09	.09

TABLE A-4 (Cont'd)

	<u>All Terms</u>		
	<u>Leave</u>	<u>Extend</u>	<u>Reup</u>
PORDDUTY	.13	.08	.08
PORTLIB	.08	.08	.06
DEPLIB	.17	.17	.13
DEPLOY	.12	.20	.13
TAD	.22	.23	.20
DUTYSTA	.26	.21	.19
DUTYTYPE	.25	.17	.13
PRESDUTY	.26	.12	.19
PAY	.26	.15	.24
BEQ	.15	.13	.14
SHIPLIVE	.27	.21	.21
AMILHOUS	.22	.36	.27
QMILHOUS	.12	.25	.18
ACIVHOUS	.13	.21	.23
QCIVHOUS	.06	.09	.16
PX	.07	.04	.08
COMMISSARY	.09	.07	.07
RECSERV	.09	.04	.09
DENTAL	.11	.15	.20
MED	.16	.17	.18
MEDDEPS	.13	.31	.28
RETIRE	.16	.16	.15
COUNSEL	.18	.15	.20

APPENDIX B
FACTOR ANALYSIS RESULTS

TABLE B-1
FACTOR DEFINITIONS

	Factor Name
Job Factors:	
JF1	Faith in the Organization
JF2	Meaningful Work
JF3	Relations with Subordinates
JF4	Personnel Utilization
JF5	Recognition/Prestige
JF6	Adequacy of Tools
JF7	Training Opportunities
JF8	Relations with Supervisors (Coworkers for MS Ratings)
JF9	Skill Utilization
JF10	Team Effort
JF11	Autonomy
JF12	Physical Work Environment
JF13	Pay/Advancement
Military Factors:	
MF1	Duty Assignment
MF2	Work Schedule-Home
MF3	Family Services
MF4	Career Support Services
MF5	Work Schedule-Deployed
MF6	Military Housing
MF7	Medical Services
MF8	Deployment Time
MF9	Quarters/Ship Habitability

TABLE B-2
FACTOR LOADINGS: HM

NOTAP Item	Factor a, b											
	<u>JF1</u>	<u>JF2</u>	<u>JF8</u>	<u>JF3</u>	<u>JF9</u>	<u>JF11</u>	<u>JF13</u>	<u>JF10</u>	<u>JF5</u>	<u>JF7</u>	<u>JF6</u>	<u>MF9</u>
MATUTIL	.811											
DOLUTIL	.809											
PERSUTIL	.418											
WORTH												
APPEAL												
CHALLENGE												
SUPCOMP												
SUPERL												
SUBCOMP												
SUBREL												
SKILLMATCH												
DEMONSTRATE												
CHALLENGE												
PRESSURE												
ENTIRE												
PAY												
ADVANCE												
TEAMWORK												
SERVICE												
RECOGNITION												
STATUS												
OJT												
SCHOOL												
GUIDANCE												
TOOLS												
SAFETY												
ADMHOUS												
ADCHOUS												
REQ												
SHIPITIVE												
PORTIVE												
DUYSTA												
PRESSDUTY												

^aSee table B-1 for factor names as reported in the main body of the paper.

^bThe factor loadings were obtained using classical factor analyses with orthogonal rotation such that the variance of squared loadings is maximized in each column of the factor matrix.

TABLE B-3
FACTOR LOADINGS: AVIATION RATINGS

NOTAP Item	Factor ^a											
	JF1	JF2	JF3	JF4	JF5	JF6	JF7	JF8	JF9	JF10	JF11	JF12
MATUTIL	.743											
DOLUTIL	.773											
PERSUTIL	.332											
WORTH		.270										
APPEAL		.563										
CHALLENGE		.581										
VARIETY		.306										
PEERCOMP			.406									
PEERREL			.378									
SUBCOMP			.594									
SUBREL			.415									
TIMEUTIL				.434								
PERSUTIL				.593								
TEMPO				.260								
RECOGNITION					.571							
STATUS					.415							
TOOLS						.555						
PARTS						.565						
OJT							.484					
SCHOOL							.248					
GUIDANCE							.536					
SUPCOMP								.489				
SUPREL								.541				
SKILLMATCH									.314			
DECIDE									.362			
DEMONSTRATE									.386			
VOICE									.211			
TEAMWORK										.381		
RESULTS										.518		
SERVICE										.212		
PRESSURE											.435	
CHANGES											.341	
COMFORT												.534
SAFETY												.369

^aSee table B-1 for factor names as reported in the main body of the paper.

TABLE B-3 (Cont'd)

<u>NOTAP Item</u>	<u>MF1</u>	<u>MF2</u>	<u>MF3</u>	<u>MF4</u>	<u>MF5</u>	<u>MF6</u>	<u>MF7</u>	<u>MF8</u>	<u>MF9</u>
DUTYSTA	.808								
DUTYTYPE	.747								
PORTWORK		.363							
PORTWATCH		.808							
PORTDUTY		.649							
PX			.619						
COMMISSARY			.701						
RECSERV			.394						
QMILHOUS				.588					
AMILHOUS				.548					
RETIRE				.282					
COUNSEL				.245					
SEAWORK					.813				
SEAWATCH					.525				
SHIPLIVE					.269				
QCIVHOUS						.682			
ACIVHOUS						.607			
QMILHOUS						.265			
AMILHOUS						.279			
DENTAL							.479		
MED							.704		
MEDDEP							.393		
DEPLOY								.348	
PORTLIB								.504	
DEPLIB								.432	
SHIPLIVE								.288	
BEQ									.588
SHIPLIVE									.281

TABLE B-4

FACTOR LOADINGS: MS

NOTAP Item	Factor ^a										
	JF1	JF2	JF8	JF9	JF11	JF6	JF7	JF10	JF12	JF5	JF3
MATUTIL	.709										
DOLUTIL	.689										
PERSUTIL	.283										
WORTH		.284									
APPEAL		.667									
CHALLENGE		.491									
VARIETY		.354									
ENTIRE		.236									
RECOGNITION		.248									
SUPCOMP			.317								
SUPREL			.290								
PEERCOMP			.573								
PEERREL			.475								
SKILLMATCH				.453							
DEMONSTRATE				.370							
DECIDE					.435						
VOICE					.342						
PRESSURE					.524						
CHANGES					.499						
TOOLS						.623					
PARTS						.549					
OJT							.495				
SCHOOL							.472				
GUIDANCE							.334				
TEAMWORK								.307			
SERVICE								.517			
RESULTS								.459			
SAFETY									.640		
COMFORT									.442		
STATUS										.658	
ADVANCE										.315	
SUBCOMP											.460
SUBREL											.546

^aSee table B-1 for factor names as they appear in the main body of the paper.

TABLE B-4 (Cont'd)

<u>NOTAP Item</u>	<u>MF6</u>	<u>MF7</u>	<u>MF1</u>	<u>MF2</u>	<u>MF3</u>	<u>MF5</u>	<u>MF8</u>	<u>MF4</u>
AMILHOUS	.636							
QMILHOUS	.642							
ACIVHOUS	.716							
QCIVHOUS	.637							
BEQ	.253							
DENTAL		.680						
MED		.696						
MEDDEPS		.557						
COUNSEL		.266						
DUTYSTA			.788					
DUTYTYPE			.756					
TAD			.335					
PORTWORK				.539				
PORTWATCH				.675				
PORTDUTY				.637				
PORTLIB				.243				
PX					.642			
COMMISSARY					.671			
RECSERV					.322			
SEAWORK						.716		
SEAWATCH						.654		
DEPLOY							.281	
TAD							.481	
DEPLIB							.620	
PORTLIB							.455	
SHIPLIV							.253	
RETIRE								.556
COUNSEL								.539

APPENDIX C

TRINOMIAL LOGIT MODEL DESCRIPTION AND ESTIMATION RESULTS

APPENDIX C
TRINOMIAL LOGIT MODEL DESCRIPTION AND ESTIMATION RESULTS

At the end of each obligation period, Navy enlisted personnel must choose among three mutually exclusive alternatives: leave active military service, extend for one or more years, or reenlist. (For our purposes, extensions of less than one year are considered a delay of decision and not included in the decision sample.) A model which can be used to estimate the probability of making each of these choices is the multinomial logit model.

We want to estimate

$$P_i = \frac{e^{\beta_1 X}}{e^{\beta_1 X} + e^{\beta_2 X} + e^{\beta_3 X}}, \quad i = 1, 2, 3$$

where $i = 1$ (leave),
 2 (extend),
 3 (reenlist).

Here, X is a vector of individual characteristics which affect the choice. Separate β s or logit coefficients, are obtained for each choice. Thus three equations are generated through estimation of this model — one describing the probability of each choice. Maximum likelihood techniques were used to obtain estimates of this model. The logit coefficients are not very informative alone. To see the response of P_i to changes in any X , we must calculate the partial effect of X on P :

$$\frac{\partial P_i}{\partial X} = \frac{(\beta_1 e^{\beta_1 X} + \beta_2 e^{\beta_2 X} + \beta_3 e^{\beta_3 X}) \beta_1 e^{\beta_1 X} - e^{\beta_1 X} (\beta_1 e^{\beta_1 X} + \beta_2 e^{\beta_2 X} + \beta_3 e^{\beta_3 X})}{(e^{\beta_1 X} + e^{\beta_2 X} + e^{\beta_3 X})^2}.$$

Evaluated at the mean, this becomes

$$\frac{\partial \bar{P}_1}{\partial \bar{X}} = \beta_1 \bar{P}_1 - \beta_1 \bar{P}_1^2 - \beta_2 \bar{P}_1 \bar{P}_2 - \beta_3 \bar{P}_1 \bar{P}_3.$$

Tables C-1 through C-14 report the maximum likelihood estimates generated for each rating. As discussed earlier, separate estimates were obtained for first-term and career personnel. Because of computer core limitations, it was also necessary to separately estimate the effect of job-specific and military-specific factors. Coefficients are shown for P_2 , the estimated probability of extending, and P_3 , the estimated probability of reenlisting. P_1 , probability of leaving, results are not shown as they are normalized in the model to equal zero. Logit coefficients were considered to be statistically significant if the absolute value of the associated Z statistic was greater than or equal to 1.03 (a significance level of 15 percent for a one-tailed test).

TABLE C-1
MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR HM, FIRST TERM

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in organization	-.096	-0.79	-.097	-1.07
Meaningful work	.301	0.70	-.238	-0.60
Relations with supervisors	-1.092	-1.92	.886	2.05
Relations with subordinates	.006	0.01	-.228	-0.26
Skill utilization	-.328	-0.41	.679	0.98
Autonomy	.244	0.33	-.772	-1.16
Team effort	.220	0.17	-1.151	-0.95
Training opportunities	-.968	-0.95	1.999	2.33
Adequacy of tools	.630	0.65	-.173	-0.19
Recognition/prestige	-.084	-0.16	-.697	-1.47
Pay/advancement	.543	1.42	-.649	-1.79
Control variables:				
Mental group 1	.323	1.31	-.070	-0.29
Mental group 4 or 5	.172	0.69	.159	0.76
Education > high school	-.005	-0.02	.012	0.07
Paygrade > E4	.193	1.63	.470	4.47
Sex=female	-.431	-2.47	.012	0.08
Race=nonwhite	-.037	-0.23	.578	4.41
Dependents > 0	.146	1.23	.306	2.87
Constant	-1.008	-7.57	-.824	-6.76
Sample size	2042			
P ₂	.08			
P ₃	.13			

TABLE C-2

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR HM, FIRST TERM

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life Factors:				
Military housing	.312	1.38	.023	0.11
Quarters/ship habitability	.125	0.41	.062	0.22
Duty assignment	.306	1.17	-.200	-0.85
Deployment time	.002	0.01	-.208	-1.87
Control Variables:				
Mental group 1	.326	1.33	-.062	-0.25
Mental group 4 or 5	.155	0.63	.214	1.05
Paygrade > E4	.187	1.59	.462	4.45
Education > high school	-.003	-0.02	-.013	-0.07
Sex=female	-.421	-2.41	.045	0.32
Race=nonwhite	-.032	-0.20	.568	4.41
Dependents	.125	1.04	.312	2.91
Constant	-1.102	-8.34	-.844	-7.09
Sample size	2042			

TABLE C-3
MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR HM, CAREER

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in the organization	-.071	-0.53	-.029	-0.27
Meaningful work	-.691	-1.15	.277	0.59
Relations with supervisors	-.158	-0.27	.642	1.40
Relations with subordinates	.385	0.42	-.075	-0.09
Skill utilization	.772	0.78	-.158	-0.19
Autonomy	.634	0.80	-.108	-0.16
Team effort	-2.773	-1.44	1.548	1.22
Training opportunities	1.862	1.68	-.904	-0.93
Adequacy of tools	.035	-0.04	.255	0.32
Recognition/prestige	-1.03	-1.55	.444	0.86
Pay/advancement	-.059	-0.14	-.304	-0.85
Control variables:				
Mental group 1	-.190	-0.50	.224	0.76
Mental group 4 or 5	.509	2.26	-.246	-1.12
Education > high school	.325	1.24	-.574	-2.20
Sex=female	-.716	-1.40	.046	0.13
Race=nonwhite	.142	0.72	-.161	-0.92
Dependents > 0	-.017	-0.08	.012	0.06
YOS 9-12	.107	0.50	.226	1.27
YOS 13-15	.508	2.10	.700	3.41
YOS 7-15	.530	2.06	.645	2.93
Constant	-.698	-2.50	.062	0.26
Sample size	726			
P ₂	.20			
P ₃	.42			

TABLE C-4
MAXIMUM LIKELIHOOD ESTIMATE OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR HM, CAREER

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life Factors:				
Military housing	.063	0.25	.217	1.04
Quarters/ship habitability	.396	1.19	-.045	-0.16
Duty assignment	.118	0.41	-.344	-1.41
Deployment time	-.329	-2.27	.004	0.03
Control Variables:				
Mental group 1	-.210	-0.56	.267	0.93
Mental group 4 or 5	.564	2.54	-.241	-1.12
Education > high school	.360	1.39	-.572	-2.21
Sex-female	-.712	-1.40	.103	0.30
Race-nonwhite	.035	0.18	-.146	-0.86
Dependents > 0	.009	0.04	-.037	-0.20
YOS 9-12	.085	0.40	.226	1.28
YOS 13-15	.572	2.41	.679	3.37
YOS > 15	.578	2.25	.629	2.87
Constant	-.692	-2.58	.115	0.51
Sample size	726			

TABLE C-5

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR AT/AW, FIRST TERM

Independent Variable	P ₂ : Extend		P ₃ : Extend	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in organization	-.055	-0.22	.120	0.55
Meaningful work	-.417	-0.60	-.656	-1.03
Relations with subordinates	.412	0.46	-.229	-0.26
Personnel utilization	-.270	-0.43	-.640	-1.08
Recognition/prestige	-.237	-0.40	.496	0.92
Adequacy of tools	.395	0.71	.231	0.45
Training opportunities	.498	0.68	-.050	-0.07
Relations with co-workers	-.133	-0.15	-.147	-0.18
Skill utilization	.363	0.25	1.081	0.80
Team effort	1.072	0.90	-.345	-0.30
Autonomy	.060	0.06	.425	0.44
Physical work environment	.076	0.09	.558	0.69
Pay	.383	1.82	-.247	-1.29
Control variables:				
Mental group 1 or 2	.337	1.27	-.380	-1.62
Paygrade > E4	.292	1.07	.376	1.40
Race=nonwhite	.528	1.50	.372	1.19
Dependents > 0	-.047	-0.22	.453	2.37
AW	-.051	-0.21	-.098	-0.40
Six year obligation	-2.324	-3.32	1.575	3.91
Constant	-1.149	-3.23	-.701	-2.21
Sample size	536			
P ₂	.11			
P ₃	.17			

TABLE C-6

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR AT/AW, FIRST TERM

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life				
Factors:				
Duty assignment	.291	1.41	.038	0.20
Work schedule - home	.259	0.80	-.085	-0.28
Family services	.301	0.77	-.188	-0.55
Work schedule - deployed	.034	0.10	.323	0.97
Military housing	.284	0.66	.055	0.14
Medical services	-.533	-1.03	.775	1.90
Deployment time	.054	0.05	-.917	-0.96
Quarters/ship habitability	-.787	-1.21	.528	0.87
Control Variables:				
Mental group 1 or 2	.299	1.14	-.391	-1.72
Paygrade > E4	.362	1.32	.302	1.13
Race=nonwhite	.472	1.33	.352	1.11
Dependents > 0	-.100	-0.44	.513	2.54
AW	-.212	-0.83	-.009	-0.04
6 year obligor	-2.349	-3.36	1.689	4.17
Constant	1.017	-2.88	-.849	-2.64
Sample size	536			

TABLE C-7
MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR AT/AW, CAREER

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in the organization	.341	1.33	-.550	-1.37
Meaningful work	.649	1.06	-.228	-0.23
Relations with subordinates	.553	0.46	2.243	1.32
Personnel utilization	-1.469	-2.02	3.394	3.06
Recognition/prestige	.072	0.08	-2.879	-1.96
Adequacy of tools	-.191	-0.34	.313	0.39
Training opportunities	-.706	-1.03	.874	0.94
Relations with co-workers	.156	0.11	-1.545	-0.68
Skill utilization	-.355	-0.24	1.758	0.80
Team effort	1.502	0.73	-2.844	-0.88
Autonomy	.861	0.84	-3.377	-2.09
Physical work environment	-.929	-1.00	-.337	-0.24
Pay	-.063	-.030	.011	0.03
Control variables:				
Mental group 1 or 2	-.051	-0.18	-.277	-0.65
Race=nonwhite	1.141	1.23	.235	0.15
Dependents > 0	-.357	-1.05	.770	1.31
AW	.282	1.35	.464	1.51
YOS 9-12	-.1.391	-4.68	1.173	2.29
YOS 13-15	-.542	-1.50	1.173	1.95
YOS > 15	-1.240	-3.16	2.370	4.00
Constant	2.145	4.48	-2.655	-3.22
Sample size	308			
P ₂	.59			
P ₃	.11			

TABLE C-8

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR AT/AW, CAREER

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life Factors:				
Duty assignment	-.289	-1.31	-.351	-1.07
Work schedule - home	.169	0.48	.644	1.32
Family services	.140	0.45	.267	0.62
Work schedule - deployed	.295	0.84	-.229	-0.44
Military housing	.441	1.00	-.991	-1.47
Medical services	-.182	-0.46	.276	0.51
Deployment time	-.227	-0.23	-1.169	-0.77
Quarters/ship habitability	-.848	-1.23	.925	0.91
Control Variables:				
Mental group 1 or 2	-.102	-0.37	-.193	-0.48
Race-nonwhite	.627	0.99	.587	0.66
Dependents > 0	-.549	-1.70	.932	1.70
AW	.274	1.36	.413	1.42
YOS 9-12	-.1.370	-4.91	.997	2.14
YOS 13-15	-.509	-1.49	1.092	1.98
YOS > 15	-1.014	-2.75	2.118	4.03
Constant	2.006	4.50	-2.661	-3.56
Sample size	308			

TABLE C-9
MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR AE/AM, FIRST TERM

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in organization	-.084	-0.41	.169	0.78
Meaningful work	-1.396	-1.98	1.103	2.09
Relations with subordinates	.121	0.20	.254	0.43
Personnel utilization	1.173	1.99	-1.358	-1.94
Recognition/prestige	-1.056	-1.58	.576	0.94
Adequacy of tools	-.025	-0.06	.501	1.17
Training opportunities	.924	1.20	-.751	-0.90
Relations with co-workers	.032	0.04	-.250	-0.30
Skill utilization	1.495	1.37	-.185	-0.17
Team effort	-1.294	-0.82	.757	0.56
Autonomy	.553	0.59	-1.241	-1.29
Physical work environment	-.758	-0.99	-.109	-0.14
Pay	-.035	-0.19	.137	0.72
Control variables:				
Mental group 1 or 2	.129	0.67	.061	0.31
Mental group 4 or 5	.190	0.81	.050	0.22
Paygrade > E4	.459	2.39	-.099	-0.52
Race=nonwhite	.384	1.74	.238	1.03
Dependents > 0	.080	0.44	.528	2.81
AE	.608	3.10	-.794	-3.46
Constant	-1.293	-5.46	-.945	-4.11
Sample size	949			
P ₂	.09			
P ₃	.09			

TABLE C-10

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR AE/AM, FIRST TERM

Independent Variable	P_2 : Extend		P_3 : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life				
Factors:				
Duty assignment	.132	0.69	-0.080	-0.40
Work schedule - home	.201	0.82	-.104	-0.40
Family services	-.422	-1.17	.178	0.55
Work schedule - deployed	-.261	-0.79	-.143	-0.43
Military housing	-.329	-0.79	.599	1.59
Medical services	-.053	-0.15	-.388	-1.05
Deployment time	.691	1.07	.238	0.35
Quarters/ship habitability	-.074	-0.14	1.072	2.06
Control Variables:				
Mental group 1 or 2	.173	0.89	.036	0.18
Mental group 4 or 5	.268	1.15	.056	0.24
Paygrade > E4	.447	2.36	-.044	-0.24
Race=nonwhite	.470	1.87	.243	1.07
Dependents > 0	.206	1.09	.528	2.72
AE	.627	3.31	-.798	-3.59
Constant	-1.450	-5.82	-.885	-3.71
Sample size	949			

TABLE C-11

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR AE/AM, CAREER

Independent Variable	P_2 : Extend		P_3 : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in organization	-.128	-0.71	-.040	-0.19
Meaningful work	-.345	-0.76	-.491	-0.93
Relations with subordinates	.263	0.43	.545	0.76
Personnel utilization	1.192	2.40	-.295	-0.48
Recognition/prestige	-.014	-0.03	.593	1.17
Adequacy of tools	.268	0.75	.191	0.48
Training opportunities	-.662	-1.22	.760	1.35
Relations with co-workers	.421	0.62	-.241	-0.30
Skill utilization	.339	0.32	-1.040	-0.86
Team effort	-.251	-0.23	1.801	1.57
Autonomy	.679	0.96	-0.246	-0.31
Physical work environment	.215	0.36	0.797	1.17
Pay	.086	0.58	-.192	-1.12
Control variables:				
Mental group 1 or 2	.117	0.71	-.042	-0.22
Mental group 4 or 5	.085	0.42	.144	0.64
Race=nonwhite	-.030	-0.16	.045	0.21
Dependents > 0	-.120	-0.59	.082	0.33
AE	.405	2.72	-.288	-1.62
YOS 9-12	-.443	-2.61	.745	3.77
YOS 13-15	.212	0.96	1.075	4.26
YOS > 15	.118	0.41	1.430	4.69
Constant	.238	0.94	-.899	-2.86
Sample size	464			
P_2	.40			
P_3	.25			

TABLE C-12

MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR AF/AM, CAREER

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life				
Factors:				
Duty assignment	.003	0.02	-.193	-1.07
Work schedule - home	.186	0.85	-.041	-0.16
Family services	.062	0.27	.074	0.29
Work schedule - deployed	-.248	-0.93	-.095	-0.31
Military housing	.343	1.22	-.663	-1.88
Medical services	-.225	-0.83	-.103	-0.33
Deployment time	.618	1.04	.375	0.53
Quarters/ship habitability	.201	0.42	.334	0.60
Control Variables:				
Mental group 1 or 2	.138	0.84	-.019	-0.01
Mental group 4 or 5	.057	0.29	.121	0.54
Race=nonwhite	-.017	-0.09	.120	0.55
Dependents > 0	-.151	-0.74	.041	0.16
AF	.436	2.95	-.322	-1.79
YOS 9-12	-.471	-2.84	.763	3.90
YOS 13-15	.186	0.85	1.110	4.43
YOS > 15	-.031	-0.11	1.519	5.03
Constant	.247	1.00	-0.732	-2.41
Sample size	464			

TABLE C-13
MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
JOB FACTORS FOR MS

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of job factors:				
Faith in organization	.614	1.58	-.208	-0.65
Meaningful work	-.907	-1.29	.388	0.82
Relations with co-workers	-.658	-0.66	.231	0.30
Skill utilization	-.008	-0.01	-.859	-1.27
Autonomy	.071	0.11	.158	0.33
Adequacy of tools	.417	0.89	.206	0.56
Training opportunities	.673	0.87	.507	0.88
Team effort	-.506	-0.38	-.050	-0.05
Physical work environment	-.057	-0.06	.255	0.35
Recognition/prestige	-.503	-0.74	-.885	-1.62
Relations with subordinates	2.889	2.49	-1.585	-1.57
Pay	-.367	-1.36	.216	1.11
Control variables:				
Mental group 1 or 2	.097	0.16	-0.572	-1.24
Mental group 3	-.514	-1.27	-.018	-0.07
Mental group 5	.293	1.13	.080	0.35
Education < high school	-.270	-0.82	.092	0.39
Race=nonwhite	.621	1.83	.495	2.06
Dependents > 0	1.005	2.41	.214	0.78
YOS 9-12	-.408	-0.86	.634	1.95
YOS 13-15	.341	0.76	.396	1.17
YOS > 15	.252	0.56	.576	1.67
Constant	-1.645	-2.83	-0.372	-0.91
Sample size	417			
P ₂	.18			
P ₃	.38			

TABLE C-14
MAXIMUM LIKELIHOOD ESTIMATES OF TRINOMIAL CHOICE MODEL:
MILITARY FACTORS FOR MS

Independent Variable	P ₂ : Extend		P ₃ : Reenlist	
	Logit Coefficient	Z statistic	Logit Coefficient	Z statistic
Quality of Military Life				
Factors:				
Military housing	.228	1.11	.090	0.55
Medical services	-.269	-1.06	.149	0.68
Duty assignment	.167	0.65	-.250	-1.22
Work schedule - home	.343	0.79	.096	0.30
Family services	-.215	-0.39	.377	0.94
Work schedule - deployed	.107	0.24	-.010	-0.03
Deployment time	.036	0.07	-.565	-1.35
Career support services	-3.200	-1.30	.582	0.32
Control Variables:				
Mental group 1 or 2	.224	0.42	-.784	-1.75
Mental group 3	-.566	-1.49	-.018	-0.07
Mental group 5	.400	1.59	.115	0.52
Education < high school	-.351	-1.11	.093	0.41
Race=nonwhite	.569	1.73	.397	1.71
Dependents > 0	1.086	2.74	.094	0.35
YOS 9-12	-.501	-1.13	.614	1.97
YOS 13-15	.162	0.40	.457	1.45
YOS > 15	.111	0.27	.604	1.86
Constant	-1.527	-2.88	-.193	-0.51
Sample size	417			

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